



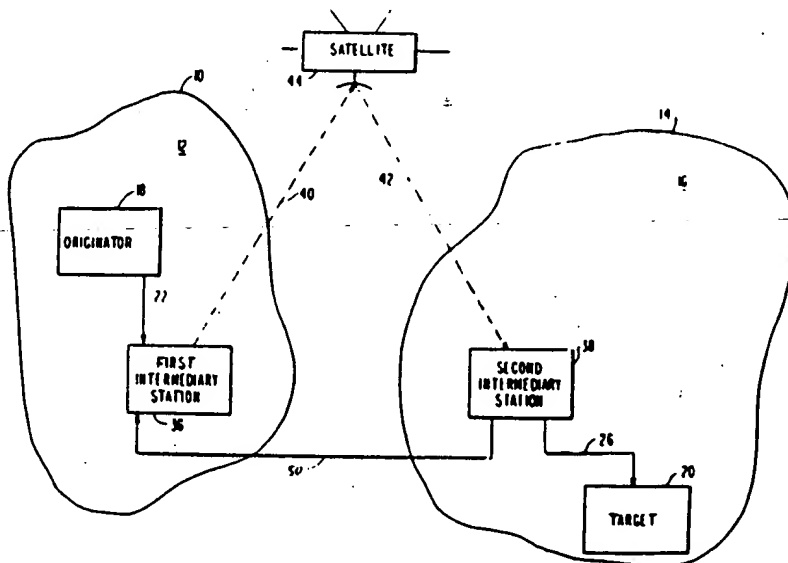
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(54) Title: METHOD OF ESTABLISHING A COST-EFFICIENT COMMUNICATIONS PATH BETWEEN INTERNATIONALLY-REMOTE PARTIES

(57) Abstract

An originator (18) located in a first national state (10) and wishing to establish a communications connection with a target (20) in a second national state (14) initiates a first communications link (22) with a first intermediary station (36) preferably located in substantial geographic proximity to the originator (18) and provides the first station (36), over the first link (22), with identifying information relating to the target (20). The first link (22) is maintained. The first intermediary station (36) then transfers the target-identifying information to a second intermediary station (38) preferably located in substantial geographic proximity to the target (20). The second intermediary station (38) thereafter initiates and establishes a second communications link (26) with the target (20) and a third communications link (50) with the first intermediary station (36). Finally, the second intermediary station (38) interconnects the second (26) and third (50) links, and the first intermediary station (36) interconnects the third (50) and first (22) links, thereby forming an integrated composite communications path or channel between the originator (18) and target (20).



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-1-

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2 METHOD OF ESTABLISHING A COST-EFFICIENT
3 COMMUNICATIONS PATH BETWEEN
4 INTERNATIONALLY-REMOTE PARTIES
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11 FIELD OF THE INVENTION
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13 The present invention is directed to
14 methods of initiating and arranging communications
15 connections such as, but not limited to, audio or
16 voice-type telephone links between exactly two
17 parties at remotely spaced-apart locations,
18 particularly at internationally-remote locations
19 such as where one of the parties is located in the
20 United States and the other is in a foreign country.

BACKGROUND OF THE INVENTION

Persons having the need to communicate, as by telephone, with another located at an internationally-remote location quickly learn that the cost of a call between, by way of example, France and the United States varies greatly depending upon the country of origin -- i.e. the place from which the call is placed. Thus, a call initiated or originating in Paris and directed to a party in New York will typically cost significantly more than the cost of the same call if originated from New York. Many factors contribute to this sizable disparity, including the often inexplicable vagaries of international long distance carrier toll charges, the general inability to direct-dial, without operator intervention, a call from most foreign countries to the United States, and the need, when placing a call to the United States from a foreign state, to utilize and thereby subject oneself to the operator-assisted toll rates and tariffs of foreign telephone companies and communications carriers.

This direction-dependent differential in calling charges is so significant that internationally-separated persons who must communicate with some frequency or regularity, for business or pleasure or otherwise personal reasons, often go to great lengths or employ elaborate subterfuges in efforts to have the communications link billed at the lowest applicable rates then available. In one commonly-used ploy where a foreign-based caller wishes to speak with a U.S.-based target, the foreign caller will telephone the

-3-

1 U.S. target, orally inform the target of the
2 caller's telephone number, and then immediately hang
3 up and wait for the target to return the call --
4 thereby resulting in the follow-up call being billed
5 at the markedly lower rates applicable to U.S.-
6 originating calls rather than at the higher rates
7 applied to calls originating in the foreign country.
8 Such a system is, however, highly dependent on the
9 foreign originator's ability to keep the initial
10 call as short in time as possible, a factor not
11 often within the exclusive control of the originator
12 and thus subject to numerous common call-lengthening
13 delays and other difficulties. For example, the
14 target may not have a writing implement, for
15 recording the number to which the return call is to
16 be directed, handy or readily available at the time
17 of the initial call, thus unexpectedly increasing
18 the caller's foreign-originating call time and costs
19 and substantially diminishing the advantages to be
20 gained by the call-back. Similarly, the wrong
21 person may answer the call at the target's location,
22 and the resulting delays in locating the target and
23 in putting him or her on the line similarly skew the
24 economic advantages potentially attainable. This
25 latter problem is particularly acute in business-
26 related calls in which, by the time the call is
27 directed through a company switchboard and one or
28 more secretaries or other intermediaries and finally
29 reaches the target, much of the savings available
30 through the return call-back are lost for all but
31 unusually lengthy follow-up connections. Moreover,
32 in a business environment it would be both unusual
33 and unprofessional to place a foreign call to a
34 business contact and then ask to be "called back".

-4-

1 An analogous situation exists with respect to
2 intranational and even local communications
3 connections or calls initiated, for example, from
4 many hotels and inns which charge a substantial
5 premium for such calls as compared to an incoming
6 call directed to a hotel guest to which no
7 surcharges or artificially-inflated toll rates are
8 applied.

-5-

OBJECTS OF THE INVENTION

It is accordingly the desideratum of the present invention to provide a method of minimizing or reducing the monetary costs associated with establishing and maintaining a communications path or connection between remotely-located parties where the calling or connection time charges differ as a function of the location from which the call originates. It is a particular object of the invention to provide such a method wherein the communications connection is between exactly two parties.

It is a further object of the invention to provide such a method where the parties are located at internationally-remote locations in different national states.

It is another object of the invention to provide such a method where the target of the communications connection is located in the United States and the originator of the connection is located in an internationally-remote, foreign national state.

An additional object of the invention is to provide such a method wherein the foreign-located originator of the call may avoid all or substantially all international tariff or toll charges associated with the initiation of a communications connection to the internationally-remote target's national state while directing the initiation of the intended communications connection from the target's location.

Still another object of the invention is to provide such a method that is simple and

-6-

1 straightforward to use and can thus be readily
2 practiced by virtually anyone without regard to
3 educational background or special training.

4 Other objects and features of the present
5 invention will become apparent from the following
6 detailed description considered in conjunction with
7 the accompanying drawings. It is to be understood,
8 however, that the drawings are designed solely for
9 purposes of illustration and not as a definition of
10 the limits of the invention, for which reference
11 should be made to the appended claims.

-7-

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein similar reference characters denote like elements throughout the several views:

Fig. 1 is a diagrammatically illustrative depiction of an international setting for use in describing a first embodiment of a method in accordance with the present invention;

Fig. 2 is a diagrammatically illustrative depiction, similar to Fig. 1, of an international setting for use in describing a second embodiment of a method in accordance with the invention;

Fig. 3 is a diagrammatically illustrative depiction of an international setting for use in describing a third embodiment of a method in accordance with the invention; and

Fig. 4 is a diagrammatically illustrative depiction, similar to Fig. 3, of an international setting for use in describing a fourth embodiment of a method in accordance with the invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention relates to the initiation and arranging and establishment of communications connections between two, preferably exactly two, parties at remotely spaced-apart locations. It is particularly directed to the establishing of such connections at reduced or minimized cost where the normal costs of a conventional direct connection between the parties differ, often by a substantial margin or multiple, as a function of the location from which the connection originates or, put another way, the direction of the call. In each of the currently preferred embodiments of the invention herein disclosed, the exactly two parties are located at internationally-separated or remote locations in different national states and, most preferably, one of the parties is located in the United States and the other is in another, i.e. foreign, country.

Various terms used in this disclosure are intended to have and encompass meanings broader than that which might otherwise at first be apparent. Thus, unless otherwise indicated or contextually clear, references to communications connections or links should be understood as including all hookups, whether by wire or radiowaves or some combination thereof, between spaced apart locations for the purpose of transmitting or receiving or exchanging, inter alia, voice or other audio-based signals, video information or imaging signals, and/or encoded or unencoded data signals, whether in analog or digital format or both. For additional ease of description, the communications connection may

-9-

1 frequently be described as or in terms of a voice-
2 type telephone call, although such usage is not
3 intended to be understood as a limitation on the
4 manner of establishing the link or on the
5 information transmitted or transmittable
6 therethrough. The parties or persons between which
7 the communications links are established may be
8 human individuals, or automated and/or manually-
9 operated equipment or apparatus, or an entity such
10 as a corporation, or any combination thereof. For
11 convenience, and to further facilitate ready
12 understanding of the invention, the party by whom
13 the communications link is, at the outset, arranged
14 or initiated is generally referred to as the
15 originator, and the party with which the originator
16 intends to finally complete the connection is,
17 herein, identified as the target or receptor. Thus,
18 all of these terms should be understood in their
19 broadest senses and in an inclusive and nonlimiting
20 manner.

21 A first embodiment of the inventive method
22 will now be described with specific reference to
23 Fig. 1 of the drawings. Diagrammatically depicted
24 in Fig. 1 are the border 10 of a first national
25 state 12 and the border 14 of a second national
26 state 16. The states 12, 16 are internationally-
27 remote from each other and, as such, they may be
28 contiguous along a common border or border portion
29 or physically separated by one or more land masses
30 or other national states or jurisdictions and/or by
31 one or more bodies of water. Thus, the national
32 states 12, 16 may, for example, represent two
33 different countries, or geographical regions, or
34 other spaced apart entities or places between which

1 communications connections are intended. It is
2 generally contemplated, in accordance with the
3 invention, that the cost of establishing and
4 maintaining a communications link of given duration
5 between the national states 12, 16 differs as a
6 function of the state from which the link is
7 initiated and, for ease of description, it is herein
8 assumed that these costs or charges are greater
9 where the link originates from the first national
10 state 12 than from the second state 16. It is
11 further assumed in this disclosure -- solely by way
12 of example and, once again, to facilitate an
13 understanding of the invention -- that the first
14 national state 12 is France and the second national
15 state 16 is the United States of America. At the
16 present time, the toll charges for telephone calls
17 made from France to the United States greatly
18 exceeds the charges for calls made from the United
19 States to France.

20 In any event, the originator 18 -- whose
21 desire or intention it is to establish the
22 communications connection or link with the target 20
23 -- is located in the first national state 12
24 (France) and the target 20 is located in the second
25 national state 16 (the United States). In this
26 first-described embodiment of the inventive method,
27 the originator 18 initiates a first communications
28 link 22, as for example by dialing on or in
29 association with a conventional telephone instrument
30 or the like, from the originator's location to an
31 intermediary 24 situated in the second national
32 state 16 of the target. The intermediary 24 --
33 which, in accordance with the invention, functions
34 to establish communications connections -- may

-11-

1 comprise a live person acting, as will hereinafter
2 become apparent, somewhat in the manner of a
3 telephone or switchboard operator or the like, or it
4 may be implemented by suitable automated or
5 semiautomated switching and communications linking
6 equipment. When the first link 22 has been
7 established, the originator 18 provides or transmits
8 or passes to the intermediary 24, over the
9 communications link 22, identifying information
10 relating to the location and/or identity of the
11 intended target 20. This identifying information
12 may, for example, be the telephone number, as with
13 all relevant country and/or area codes, of the
14 target, and/or it may comprise other information
15 relating to the target and from which the
16 intermediary 24 is capable of deriving or
17 determining the telephone number or other
18 communications channel linking data for the target.
19 It should be further understood that the originator
20 18 may provide the intermediary 24 with the
21 identifying information in any suitable manner such
22 as orally, or by manually entering the data through
23 the originator's telephone or other keypad or
24 keyboard in response to a specific request for the
25 information from the intermediary, or in any other
26 appropriate fashion as a matter of design or
27 operating choice. It will also generally be
28 necessary for the originator 18 to identify his or
29 her own identity and/or location to the intermediary
30 over or through the first link 22, although
31 arrangements in which the separate, specific
32 transmission of originator-identifying information
33 to the intermediary is not required -- as for
34 example where frequent or regular users of or

1 subscribers to a system implementing the invention
2 access a dedicated link to the intermediary, or the
3 intermediary or communications system otherwise has
4 the capability to automatically identify the
5 location and/or identity of the originator 18 of the
6 first communications link 22 -- are also within the
7 intended scope and contemplation of the invention.
8 For purposes of explanation, it is assumed herein
9 that the originator provides the intermediary with
10 his or her telephone number and/or a subscriber
11 account code, and with the telephone number of the
12 target, either orally or by entering the appropriate
13 digits through a touch-tone dialing keypad.
14 Optionally, the originator may also supply the
15 intermediary with time or interval delay information
16 for instructing the intermediary to establish the
17 subsequent communications link with the target, as
18 will hereinafter be understood, at a thus-specified
19 future time or delay interval rather than
20 immediately as is normally contemplated.

21 After the originator 18 has supplied the
22 intermediary 24, through the first communications
23 link 22, with at least the identifying information
24 relating to the intended target 20, the link 22 may
25 be and is, preferably, terminated. Termination of
26 the link 22 may be effected by or from the location
27 of either the originator 18 or the intermediary 24.
28 The intermediary then initiates and establishes a
29 second communications link 26 from the intermediary
30 to the location of the target 20 using, or by
31 derivatively making use of, the target-identifying
32 information supplied to the intermediary by the
33 originator over the first communications link 22.
34 Here again, described in the context of a

-13-

1 conventional voice-type telephone connection, the
2 second link 26 may for example be initiated by
3 manual or automated or semiautomated dialing of a
4 standard telephone instrument or the like, or
5 through electronic generation of conventional touch-
6 tone dialing tone pairs or of other data signals as
7 is well known in the art, over a voice-grade analog
8 telephone line.

9 When the second communications link 26 has
10 been established between the intermediary 24 and the
11 location of the target 20, and in the event that the
12 originator 18 has communicated to the intermediary
13 the originator's intention to establish a connection
14 with a particular target individual, the
15 intermediary may, optionally, determine whether that
16 target individual is at the target location or is
17 otherwise available. The intermediary 24 also
18 initiates and establishes a third communications
19 link 28 from the intermediary to the location of the
20 originator 18; this third link may be set up prior
21 to, or substantially concurrently with, or
22 subsequent to the establishment of the second link
23 26. The third communications link 28, like the
24 second link, may for example comprise a voice-grade
25 analog communications path over standard telephone
26 lines or the like and may be initiated by
27 conventional dialing of a telephone-type instrument
28 or equivalent pulse or tone-generating apparatus.

29 With the second and third communications
30 links 26, 28 established, the second and third links
31 are connected together so as to enable direct
32 communication between the originator 18 and the
33 target 20. This connection of the second and third
34 communications links or paths may be effected by,

1 and at or from the location of, the intermediary 24,
2 and may be carried out in any conventional or
3 otherwise suitable manner including, but not limited
4 to, interconnecting the data-carrying communications
5 lines directly or across an isolating transformer or
6 the like. It is not necessary -- indeed, in most
7 presently contemplated situations it is neither
8 intended nor desired -- that the intermediary remain
9 as a third communicating party in the interconnected
10 second and third communications links. In any
11 event, in accordance with the invention an
12 integrated communications pathway or connection or
13 channel between the originator 18 in the first
14 national state 12, and the target 20 in the second
15 national state 16, is thus established, with both
16 parts of the integrated communications channel --
17 i.e. the second and third links 26, 28 -- having
18 originated in or been initiated from the second
19 national state. Since the communications tariffs or
20 rates are substantially lower on calls originating
21 in the second state 16 as compared to those
22 originating in the first state 12, the resulting
23 integrated communications path or channel between
24 the originator and the target will cost
25 significantly less than had the originator directly
26 called or otherwise initiated a direct link to the
27 target.

28 As should now be apparent, the total cost
29 of establishing and maintaining the integrated
30 communications connection between the originator 18
31 and target 20 will be, at a minimum, the sum of
32 three separate components -- i.e. the cost of the
33 first link 22 from the originator to the
34 intermediary 24, the cost of the second link 26 from

-15-

1 the intermediary to the target, and the cost of the
2 third link 28 from the intermediary to the
3 originator. In accordance with current
4 communications rate structures, each of these costs
5 will generally be determined, inter alia, as a
6 function of the timed length or duration of the
7 respective connection. Thus, in the context of this
8 first embodiment of the inventive method as
9 described in conjunction with Fig. 1, this total
10 cost may be minimized by minimizing the duration of
11 the first link 22 so as to reduce the cost of that
12 first link, and by attempting to have the lowest
13 possible communications rates applied to the second
14 link 26 between the intermediary 24 and target 20
15 through, for example, minimizing the physical
16 distance between the intermediary and target.

17 This latter objective of advantageously
18 minimizing the cost of the second link through
19 physical proximity of the intermediary and target
20 may, by way of example, be achieved in accordance
21 with a second embodiment of the invention. This
22 second embodiment contemplates a relatively minor
23 modification to the first form of the invention
24 described in conjunction with Fig. 1 and, as such,
25 only the specific modifications and their effects on
26 the hereinabove-disclosed method will be expressly
27 pointed out.

28 Thus, and as shown in Fig. 2, the
29 intermediary in this second embodiment comprises a
30 multiplicity of physically remote or separated parts
31 or stations, all located in the second national
32 state 14, and identified in the drawing as a first
33 intermediary station 30 and a second intermediary
34 station 32. As a practical matter, one of the

intermediary stations 30, 32 will generally be physically closer to the intended target 20 --or at least at a location from which the charges for a call to the target are less -- than the other and, for purposes of description, it is assumed that the second intermediary 32 is located closer to the target 20 than is the first intermediary 30. Those skilled in the art will readily appreciate, as this description proceeds, that the number of intermediary parts or stations may advantageously, and will preferably, exceed two and, indeed, that as a general matter the greater the number of such stations located in and about the second national state 16 the greater the potential cost savings that can be realized in accordance with the invention. Thus, a communications network or system developed or available for use in the practice of the method of the invention may advantageously include a plurality of physically-separated intermediary parts or stations or locations. Nevertheless, for ease of description -- and since it is presently contemplated in respect of this second embodiment that, for any particular communications connection between an originator 18 and a target 20, no more than two (of perhaps many available) intermediate stations will be employed -- only the two stations 30, 32 are illustrated in Fig. 2.

In this second embodiment of the invention, the originator 18 initiates the first communications link 22 to one of the intermediary stations, shown by way of example in Fig. 2 as the first station 30. It is generally contemplated that the originator will initiate the first link to that intermediary station to which the communications

-17-

1 rates are the lowest relative to the other
2 intermediary stations, typically that station
3 located in closest physical proximity to the
4 originator. For example, if the originator 18 is in
5 Paris, France, the first station 30 is in New York
6 City and the second station 32 is in Los Angeles,
7 California, the originator may perhaps minimize the
8 cost of the first link 22 by calling the first
9 station 30 in New York rather than the second
10 station 32 in Los Angeles. After the originator 18
11 has provided the first intermediary station 30, over
12 or through the first link 22, with the identifying
13 information relating to the location and/or identity
14 of the target 20, the first link preferably is
15 terminated as heretofore described in connection
16 with the Fig. 1 embodiment of the invention.

17 With the identifying information in hand,
18 the first station 30 -- recognizing or determining
19 that the second station 32 is located in physically-
20 closer proximity or in an otherwise more cost-
21 effective location to the target than the first
22 station 30 -- initiates or establishes a
23 communications interlink 34 to the second
24 intermediary station 32. The first station 30 then
25 transmits or provides the identifying information
26 received from the originator 18, or related target-
27 location information derived therefrom, to the
28 second station 32 over the interlink 34. The
29 interlink 34 may be terminated, by or from either
30 the first or second intermediary stations as a
31 matter of design choice or operating efficiency or
32 capability, after the required information has been
33 passed from the first station 30 to the second
34 station 32 over the interlink. Having received this

1 identifying information over the interlink 34, the
2 second station may then proceed to establish the
3 second and third communications links 26, 28 to the
4 target 20 and originator 18, respectively, and to
5 interconnect the two for enabling direct
6 communication between the originator and target in
7 accordance with the description hereinabove set
8 forth with respect to the first embodiment of the
9 inventive method.

10 Thus, in accordance with this second
11 embodiment and modification of the first-disclosed
12 method of the invention, the cost of one of the
13 major components of the total communications charges
14 incurred in creating an integrated communications
15 pathway or channel between the originator 18 and
16 target 20 -- more particularly the cost of the
17 second communications link 26 -- is reduced. It
18 should also be recognized that the additional costs
19 associated with establishing the interlink 34 may be
20 minimized by implementing the interlink, by way of
21 example, using dedicated lines or transmission paths
22 between the intermediary stations, or through
23 microwave or other high-speed data links for
24 transmitting the target-identifying information
25 between intermediary stations in multiplexed or
26 other high-speed data bursts.

27 A third embodiment of the invention will
28 now be described with specific reference to Fig. 3
29 of the drawings. Here, again, to avoid unnecessary
30 repetition only the specific modifications to the
31 earlier-described embodiments and the effects of
32 such modifications will be expressly described. As
33 shown in Fig. 3, the intermediary is in this
34 instance comprised of physically-separated first and

-19-

1 second stations 36, 38 which are located in
2 different national states. In the particular form
3 of the invention illustrated, the first station 36
4 is located in the first national state 12 -- in
5 which the originator 18 is also located -- and the
6 second station 38 is located in the second national
7 state 16 of the target 20. This arrangement
8 accordingly results in a substantial reduction in
9 the cost of the originator-initiated first link 22
10 from the originator 18 to the intermediary over
11 those alternate arrangements heretofore described
12 since the first link need not, in this case, cross
13 national borders or boundaries. Indeed, where the
14 originator and first intermediary station 36 are
15 located in relatively close physical proximity, the
16 cost of the first link 22 may be so small as to be
17 effectively insignificant; for this purpose,
18 multiple first stations 36 may be located throughout
19 the first national state 12 for use by variously-
20 located originators in the first state 12. And
21 although further modifications in which the first
22 intermediary station 36 is located in a third
23 national state -- i.e. a state other than both the
24 first and second states 12, 16 -- are also
25 contemplated, even then may the costs of the first
26 link 22 be reduced over the previously-described
27 embodiments by locating the first station 36 in such
28 a third national state to which the communications
29 rates or charges for links originating in the first
30 state 12 are lower than for links directed from the
31 first to the second state 16.

32 In order to take maximum advantage of the
33 first link cost savings available in the practice of
34 the Fig. 3 embodiment of the invention, it is

preferred that the transmission of the target-identifying information from the first intermediary station 36 to the second station 38, over an interlink established therebetween, be effected in an efficient and most economical manner. One of way of achieving economical transmission of the identifying information between the respective intermediary stations in the first and second national states is, subject to suitable inter-station spacing or distance, the use of line-of-sight microwave broadcast links through which high-speed data transmissions are readily accomplished. Where the distance between the first and second stations 36, 38, or additional physical or economic or other factors, do not permit such microwave links, however, alternative interlinking arrangements may be employed. As diagrammatically illustrated, by way of example, in Fig. 3, the communications interlink between the first and second intermediary stations 36, 38 may comprise the combination of a data transmission uplink 40 to and downlink 42 from a satellite or data relaying spacecraft 44 located in a suitable orbital location or path. Similar arrangements in which a transmitted data signal is bounced or reflected off an atmospheric layer or the like, as is known, are also contemplated. Indeed, the exact manner of achieving or effectuating the interlink between the first and second intermediary stations 36, 38, and the preferred use of high-speed data transmission methods and apparatus, should be understood to be general matters of design choice selected in accordance with the intended functionality and operational efficiency of the inventive method.

-21-

1 Yet another embodiment of the invention is
2 illustrated in Fig. 4 of the drawings. This fourth
3 embodiment is most similar to that hereinabove
4 described in connection with Fig. 3, differing
5 primarily in the inclusion of a third intermediary
6 station 46 located in the second national state 16
7 and, most preferably, in closer physical proximity
8 to the target 20 than the second intermediary
9 station 38. As should by now be apparent, in this
10 fourth embodiment the target-identifying information
11 received by the second station 38 over the interlink
12 40, 42 is, in turn passed on or transmitted to the
13 third station 46 over a second interlink 48 -- of
14 any suitable form -- connecting the second and third
15 intermediary stations 38, 46. It is contemplated
16 that the second interlink 48 is initiated and
17 established by the second station 38 for the purpose
18 of passing the target-identifying information on to
19 the third station 46, following which the second
20 interlink may be terminated. The identifying
21 information may thus be passed on to the third
22 intermediary station to take advantage of the closer
23 proximity of the third station 46 than the second
24 station 38 to the target 20. In other arrangements,
25 the second station 38 may be constructed or
26 functional solely for receiving downlinked data from
27 the satellite 44 or the like whereby transmission or
28 passage of the target-identifying data to another
29 intermediary station -- identified herein as the
30 third station 46 -- whether or not in closer
31 physical proximity to the target 20, would be
32 necessary. In any event, in this last embodiment
33 of the invention it is the third station 46 that
34 initiates or establishes the second link 26 to the

-22-

1 target 20 and the third link 28 to the originator
2 18, and that effects or initiates the
3 interconnection of the second and third links to
4 place the originator and target in direct
5 communication with one another.

6 A fifth embodiment of the invention will
7 now be described with particular reference to Fig.
8 5. Fig. 5 is perhaps most similar to that
9 arrangement previously disclosed in conjunction with
10 Fig. 3 and, to avoid unnecessary repetition, only
11 the specific modifications to that earlier-described
12 method will be expressly described.

13 As seen in Fig. 5, here again the
14 intermediary is formed of physically-separated first
15 and second stations 36, 38 which are located in
16 different national states 12, 16. In this
17 embodiment, it is most preferred -- for reasons that
18 will soon become apparent -- that the first station
19 36 is located in the first national state 12 of the
20 originator 18, or at least at a location
21 geographically proximate the originator 18 or
22 otherwise sufficient to suitably minimize the
23 monetary cost of the originator-initiated first link
24 22 from the originator to the first intermediary
25 station 36. This preference is based on one of the
26 primary differences between this fifth embodiment
27 and that previously described with respect to Fig.
28 3; namely, in this further embodiment the first link
29 22 is maintained -- i.e. is not terminated by either
30 the originator 18 or the first intermediary station
31 36 -- after the originator has supplied the station
32 36 with the target identifying information as, for
33 example, through the satellite uplink 40 and
34 downlink 42. Rather, the first link 22 is

-23-

1 maintained while the first station 36 communicates
2 with the second intermediary station 38, and while
3 the second station 38 originates and establishes the
4 second communications link 26 from the second
5 station to the target 20. Neither is the first link
6 22 terminated as the second intermediary station 38
7 originates and establishes a third communications
8 link 50 from the second station to the first
9 intermediary station 36. When this third link 50
10 has been established, the second and third links 26,
11 50 are connected together by the second intermediary
12 station 38 so as to enable direct communication
13 therebetween of voice or data or other signals
14 carried respectively thereon. Similarly, and
15 preferably or generally substantially concurrently
16 therewith, the third link 50 and the first link 22
17 are connected together by the first intermediary
18 station 36, thereby completing an integrated, direct
19 communication path between the originator 18 and the
20 target 20 over the now-connected links 22, 50, 26.

21 The advantages of this last-described
22 embodiment of the invention are significant. For
23 example, this method provides a calling or
24 communications arrangement that operates, with
25 respect to most conventional, currently-practiced
26 methods, most normally or transparently to the user
27 -- particularly the originator 18. There is no need
28 for the originator to first place the call, hang up
29 and await a callback (unless, of course,
30 predeterminately delayed completion of the composite
31 connection has expressly been requested or the
32 target is not immediately available as, by way of
33 example, in the case of a busy called line). The
34 call is placed by the originator and, after a not-

1 unduly lengthy or unusual delay for an international
2 call, the target comes on the line. Automated or
3 directly-spoken voice prompts or status statements
4 may be provided to the originator, and/or to the
5 target, from time-to-time as may be necessary or
6 appropriate. Moreover, the initial provision of the
7 target-identifying information may be handled in a
8 wholly or partly automated fashion, such as by
9 having the originator first key in the telephone
10 number of the first station 36, awaiting an
11 instructional tone or message, and then keying in
12 the target's telephone number or the like.
13 Similarly, data identifying the originator can be
14 supplied automatically by suitable apparatus,
15 perhaps built into a subscriber's telephone set or
16 line and well within the skilled individual's
17 abilities to construct, that is directly
18 interrogated by the intermediary station.

19 - This fifth embodiment of the inventive
20 method is also especially capable of realizing
21 significant economic savings to the operator of such
22 a system of which originating subscribers may become
23 members to achieve notable savings in placing
24 international calls from foreign national states.
25 By appropriate placement of multiple intermediary
26 stations throughout the national states of
27 originators and targets to whom the service is
28 specifically directed, and the use of such suitably
29 selected communications links such as satellite
30 channels, microwave links, and dedicated or leased
31 lines and the like, the service provider may greatly
32 minimize its direct communications costs in
33 establishing originator-to-target communications
34 paths to a level potentially far below those

-25-

1 available to direct dialers from whichever direction
2 of the link. That is, as seen in Fig. 5 the
3 originator 18 may, by way of example, himself pay
4 the cost of the first link 22 which, for callers in
5 major foreign or metropolitan cities, may in effect
6 be only that for a "local" call. Suitable placement
7 of multiple second intermediary stations 38 in the
8 nationality or location or geographic proximity of
9 the target will minimize the cost of the second link
10 26 and, again, may result in a only substantially
11 token charge for a "local" call as the second link
12 26. Finally, by assuring in accordance with this
13 method that the third link 50 is placed between its
14 own intermediary stations 36, 38, the service
15 provider is capable of exercising maximum control
16 over the costs of the third link by, as indicated
17 above, constructing or contracting for the use of
18 reduced-cost dedicated lines or links. Indeed, as
19 should now be apparent while the present invention
20 may be initially presented or marketed to the public
21 as an economical way of "reversing" charges on calls
22 or communications links established from foreign
23 nationalities or locations of unusually high cost,
24 this fifth embodiment provides an arrangement
25 wherein the relative cost differential in making a
26 call from the originator to the target, or vice-
27 versa, is almost besides the point.

28 Finally, it should be noted and pointed
29 out that although this fifth embodiment of the
30 invention has been described with specific reference
31 to Fig. 5 of the drawings which depicts an
32 intermediary comprised of only two (i.e. first and
33 second) stations 36, 38, those skilled in the art
34 should by now readily appreciate that maximum

1 efficiency of operation of this last-disclosed
2 method may be realized by increasing the number of
3 first, and/or second, stations 36, 38. That is, in
4 a most preferred form of this fifth embodiment at
5 least the second intermediary station 38 consists of
6 a plurality of substations located suitably about
7 the second national state 16 and, in a still further
8 preferred embodiment, the first intermediary station
9 36 similarly consists of a plurality of substations
10 located suitably about the first national state 12
11 or otherwise in sufficient geographic proximity to
12 the locations of service subscriber originators 18.
13 Moreover, such an arrangement can be most
14 efficiently and economically practiced by
15 implementing each intermediary station or substation
16 with fully or appropriately automated apparatus
17 dedicated to the purposes and operating practices
18 herein disclosed.

19 While there have been shown and described
20 and pointed out fundamental novel features of the
21 invention as applied to several preferred
22 embodiments thereof, it will be understood that
23 various additional omissions and substitutions and
24 changes in the form and details of the methods
25 described and illustrated, and in the manner of
26 their practice, may be made by those skilled in the
27 art without departing from the spirit of the
28 invention. Those skilled in the art will recognize
29 and appreciate, by way of example, that the exact
30 order or sequence in which the various steps that
31 comprise the inventive method are implemented or
32 practiced may be varied as matters of design choice
33 and operating preference and/or to suit or adapt to
34 conditions relevant to the details of the

-27-

1 communications links or paths which are initiated or
2 established. Moreover, although the invention has
3 been described herein in the context of
4 communications connections between internationally-
5 remote parties, the same or similar cost-saving
6 methods may be applied to intranational
7 communications where the originator and target are
8 located in the same national state and the costs of
9 a conventional direct communications connection
10 between the parties are notably greater when the
11 path is established by the originator than when
12 established by the target. It is also contemplated
13 that, in order to further minimize the costs of the
14 first communications link 22 in the various
15 disclosed embodiments of the invention, that link
16 may comprise a high speed or other data link over
17 which the originator can transmit to the
18 intermediary a compressed or otherwise defined
19 packet or batch of information containing such data
20 as the identity and/or location of the intended
21 target, and the identity and/or location of the
22 originator. It is the intention, therefore, to be
23 limited only as indicated by the scope of the claims
24 appended hereto.

-28-

CLAIMS

What is claimed is:

1. A method of completing a communications connection between exactly two persons each internationally-remote from the other, said persons comprising an originator at a location in a first national state and a receptor at a location in a second national state, comprising the steps of:

(A) initiating a first communications connection from the location of said originator to an intermediary in a national state other than said first national state for the sole purpose of supplying said intermediary with identifying information relating to at least one of the identity of the receptor, the location of the receptor, the identity of the originator and the location of the originator;

(B) communicating to said intermediary, through said first communications connection, said identifying information;

(C) terminating said first communications connection after said step of communicating the identifying information to the intermediary;

(D) initiating a second communications connection from said intermediary to the location of the receptor;

(E) initiating a third communications connection from said intermediary to the location of the originator; and

(F) connecting said second and third communications connections so as to link the

-29-

1 internationally-remote locations of and thereby
2 complete a communications connection between the
3 originator and the receptor;

4 wherein said step (B) is carried out
5 after said step (A), said step (C) is carried out
6 after said step (B), and said steps (D), (E) and (F)
7 are carried out after said step (C).

8 2. A method in accordance with claim 1,
9 wherein said identifying information communicated to
10 the intermediary comprises a telephone number of the
11 location of the receptor.

12 3. A method in accordance with claim 1,
13 wherein said second and third communications
14 connections comprise voice-type telephone links so
15 as to enable a telephone conversation between the
16 originator and the receptor on completion of said
17 steps (D), (E) and (F).

18 4. A method in accordance with claim 2,
19 wherein said second and third communications
20 connections comprise voice-type telephone links so
21 as to enable a telephone conversation between the
22 originator and the receptor on completion of said
23 steps (D), (E) and (F).

24 5. A method in accordance with claim 1,
25 wherein said first communications connection is
26 initiated by the originator.

27 6. A method in accordance with claim 1,
28 wherein said identifying information is communicated
29 to said intermediary by the originator.

30 7. A method in accordance with claim 1,
31 wherein said second communications connection is
32 initiated utilizing the identifying information
33 communicated to the intermediary over said first
34 communications connection.

1 8. A method in accordance with claim 6,
2 wherein said second communications connection is
3 initiated utilizing the identifying information
4 communicated to the intermediary over said first
5 communications connection.

6 9. A method in accordance with claim 1,
7 wherein said step (F) is carried out after said
8 steps (D) and (E).

9 10. A method in accordance with claim 9,
10 wherein said step (E) is carried after said step
11 (D).

12 11. A method in accordance with claim 1,
13 wherein said intermediary is located in said second
14 national state.

15 12. A method in accordance with claim 1,
16 wherein the intermediary performs said step (F) of
17 connecting the second and third communications
18 connections.

19 13. A method in accordance with claim 11,
20 wherein said intermediary comprises a first station
21 and a second station, said second station being
22 located in closer physical proximity than said first
23 station to the receptor, said intermediary of said
24 steps (A), (B) and (C) comprising said first
25 station, said intermediary of said steps (D) and (E)
26 comprising said second station, and further
27 comprising the steps of:

28 (G) initiating a fourth
29 communications connection from said first station to
30 said second station; and

31 (H) communicating from said first
32 station to said second station, through said fourth
33 communications connection, said identifying
34 information communicated to said first station

-31-

1 through said first communications connection.

2 14. A method in accordance with claim 13,
3 wherein said steps (G) and (H) are carried out
4 between said steps (C) and (D).

5 15. A method in accordance with claim 1,
6 wherein said intermediary comprises a first station
7 and a second station, said second station being
8 located in closer physical proximity than said first
9 station to the receptor, said intermediary of said
10 steps (A), (B) and (C) comprising said first
11 station, said intermediary of said steps (D) and (E)
12 comprising said second station, and further
13 comprising the steps of:

14 (G) initiating a fourth
15 communications connection from said first station to
16 said second station; and

17 (H) communicating from said first
18 station to said second station, through said fourth
19 communications connection, said identifying
20 information communicated to said first station
21 through said first communications connection.

22 16. A method in accordance with claim 15,
23 wherein said steps (G) and (H) are carried out
24 between said steps (C) and (D).

25 17. A method in accordance with claim 1,
26 wherein said intermediary comprises a first station
27 and a second station, said second station being
28 located in said second national state, said
29 intermediary of said steps (A), (B) and (C)
30 comprising said first station, said intermediary of
31 said steps (D) and (E) comprising said second
32 station, and further comprising the steps of:

33 (G) initiating a fourth
34 communications connection from said first station to

1 said second station; and

2 (H) communicating from said first
3 station to said second station, through said fourth
4 communications connection, said identifying
5 information communicated to said first station
6 through said first communications connection.

7 18. A method in accordance with claim 17,
8 wherein said steps (G) and (H) are carried out
9 between said steps (C) and (D).

10 19. A method in accordance with claim 17,
11 wherein said step (F) is carried out at said second
12 station of said intermediary.

13 20. A method of completing a
14 communications connection between exactly two
15 persons each internationally-remote from the other,
16 said persons comprising an originator at a location
17 in a first national state and a receptor in a second
18 national state, comprising the steps of:

19 (A) supplying to a means for
20 establishing communications connections, through a
21 first communications link connecting said means and
22 the originator, identifying information relating to
23 at least one of the identity of the receptor, the
24 location of the receptor, the identity of the
25 originator and the location of the originator, said
26 first link being initiated by the originator and
27 being directed by the originator to said means for
28 the sole purpose of supplying said means with said
29 identifying information, said means for establishing
30 communications connections being located at a
31 location remote from the location of the originator;

32 (B) initiating a second
33 communications link from said means to the location
34 of the receptor;

-33-

1 (C) initiating a third
2 communications link from said means to the location
3 of the originator; and

4 (D) connecting said second and third
5 communications links so as to complete a
6 communications connection between the
7 internationally-remote locations of the originator
8 and receptor;

9 whereby said steps (B), (C) and (D)
10 are carried out after said step (A).

11 21. A method in accordance with claim 20,
12 wherein said means comprises a first intermediary
13 and a second intermediary including means for
14 establishing a fourth communications link connecting
15 said first and second intermediaries, said second
16 intermediary being located in a national state other
17 than said first national state, and wherein said
18 first communications link connects said first
19 intermediary and the originator.

20 22. A method in accordance with claim 21,
21 wherein said first intermediary is located in said
22 first national state of the originator.

23 23. A method in accordance with claim 21,
24 wherein said second intermediary initiates said
25 second and third communications links.

26 24. A method in accordance with claim 23,
27 further comprising the step of (E) communicating
28 said identifying information from said first to said
29 second intermediary using a fourth communications
30 link established by said means for establishing a
31 fourth communications link.

32 25. A method in accordance with claim 23,
33 further comprising the step of (E) communicating a
34 receptor location-identifier, derived from said

-34-

1 identifying information, from said first to said
2 second intermediary using a fourth communications
3 link established by said means for establishing said
4 fourth communications link.

5 26. A method in accordance with claim
6 24, wherein said first intermediary is located in
7 said first national state of the originator.

8 27. A method in accordance with claim 25,
9 wherein said first intermediary is located in said
10 first national state of the originator.

11 28. A method in accordance with claim 21,
12 wherein said second intermediary is located in said
13 second national state.

14 29. A method in accordance with claim 22,
15 wherein said second intermediary is located in said
16 second national state.

17 30. A method in accordance with claim 24,
18 wherein said second intermediary is located in said
19 second national state.

20 31. A method in accordance with claim 26,
21 wherein said second intermediary is located in said
22 second national state.

23 32. A method in accordance with claim 20,
24 wherein said step (A) comprises the steps of:

25 (E) establishing the first
26 communications link;

27 (F) communicating said identifying
28 information from the originator to said means; and

29 (G) terminating the first
30 communications link;

31 wherein said step (F) is carried out
32 after said step (E) and said step (G) is carried out
33 after said step (F).
34

-35-

1 33. A method in accordance with claim 32,
2 wherein said means comprises a first intermediary,
3 a second intermediary and means for establishing a
4 fourth communications link connecting said first and
5 second intermediaries, said second intermediary
6 being located in a national state other than said
7 first national state, and wherein said first
8 communications link connects said first intermediary
9 and the originator.

10 34. A method in accordance with claim 33,
11 wherein said first intermediary is located in said
12 first national state of the originator.

13 35. A method in accordance with claim 20,
14 wherein said first communications link comprises a
15 data link.

16 36. A method in accordance with claim 32,
17 wherein said first communications link comprises a
18 data link.

19 37. A method in accordance with claim 21,
20 wherein said fourth communications link comprises a
21 data link.

22 38. A method in accordance with claim 37,
23 wherein said first communications link comprises a
24 data link.

25 39. A method in accordance with claim 37,
26 wherein said second intermediary is located in said
27 second national state and said first intermediary is
28 located in a national state other than said first
29 and second national states.

30 40. A method in accordance with claim 39,
31 wherein said first intermediary is located in said
32 first national state.

33 41. A method in accordance with claim 21,
34 wherein said fourth communications link comprises a

high speed data link.

42. A method in accordance with claim 20, wherein said means performs said step (D) of connecting the second and third communications links.

43. A method in accordance with claim 21, wherein said second intermediary performs said step (D) of connecting the second and third communications links.

44. A method in accordance with claim 23, wherein said second intermediary performs said step (D) of connecting the second and third communications links.

45. A method in accordance with claim 21, wherein said means further comprises a third intermediary including means for establishing a fifth communications link connecting said second and third intermediaries, said third intermediary being located in said second national state.

46. A method in accordance with claim 45, wherein said third intermediary initiates said second and third communications links.

47. A method in accordance with claim 46, further comprising the steps of:

(E) communicating said identifying information from said first to said second intermediary using a fourth communications link established by said means for establishing a fourth communications link; and

(F) communicating said identifying information from said second to said third intermediary using a fifth communications link established by said means for establishing a fifth communications link.

-37-

1 48. A method in accordance with claim 47,
2 wherein said first intermediary is located in said
3 first national state of the originator.

4 49. A method in accordance with claim 47,
5 wherein said second and third intermediaries are
6 located in said second national state.

7 50. A method in accordance with claim 49,
8 wherein said third intermediary is located in closer
9 proximity to said target than said second
10 intermediary.

11 51. A method in accordance with claim 50,
12 wherein said first intermediary is located in said
13 first national state of the originator.

14 52. A method of completing a composite
15 communications connection between exactly two
16 persons each internationally-remote from the other,
17 said persons comprising an originator at a location
18 in a first national state and a receptor at a
19 location in a second national state, comprising the
20 steps of:

21 (A) initiating a first
22 communications connection from the location of said
23 originator to a first station of a means for
24 establishing communications connections, said first
25 station being located in geographic proximity to the
26 location of the originator;

27 (B) supplying to the first station,
28 through the first communications link connecting the
29 first station and the originator, identifying
30 information relating to at least one of the identity
31 of the receptor and the location of the receptor;

32 (C) maintaining said first
33 communications connection during the entire time
34 from said initiation thereof to the completion of

1 said composite communications connection;

2 (D) transferring said identifying
3 information to a second station of said means for
4 establishing communications connections, said second
5 station being located in closer geographic proximity
6 to the location of the receptor than said first
7 station;

8 (E) initiating a second
9 communications link from said second station to the
10 location of the receptor;

11 (F) initiating a third
12 communications link from said second station to said
13 first station;

14 (G) connecting said second and third
15 communications links at said second station; and

16 (H) connecting said third and first
17 communications links at said first station so as to
18 complete a composite communications connection
19 between the internationally-remote locations of the
20 originator and receptor over the combination of said
21 first, second and third communications links;

22 whereby said steps (E), (F), (G) and
23 (H) are carried out after said step (A), said step
24 (D) is carried out after said step (A), and said
25 step (F) is carried out after said step (D).

26 53. A method in accordance with claim 52,
27 wherein said first station includes means for
28 establishing a fourth communications link at least
29 temporarily connecting said first and second
30 stations and over which said identifying information
31 is supplied from said first to said second station.

32 54. A method in accordance with claim 53,
33 wherein said fourth communications link comprises a
34 unidirectional link for transmitting said

-39-

1 identifying information from said first to said
2 second station.

3 55. A method in accordance with claim 53,
4 further comprising the step of (I) terminating said
5 fourth communications link after said supplying of
6 said identifying information from said first to said
7 second stations over said fourth link.

8 56. A method in accordance with claim 52,
9 wherein said first station is located in said first
10 national state of the originator.

11 57. A method in accordance with claim 52,
12 wherein said second station is located in said
13 second national state of the receptor.

14 58. A method in accordance with claim 52,
15 wherein said first station is located in said first
16 national state of the originator and the second
17 station is located in said second national state of
18 the receptor.

19 59. A method in accordance with claim 52,
20 wherein said second station performs said step (E)
21 of initiating said second communications link.

22 60. A method in accordance with claim 52,
23 wherein said second station performs said step (F)
24 of initiating said third communications link.

25 61. A method in accordance with claim 59,
26 wherein said second station performs said step (F)
27 of initiating said third communications link.

1/5

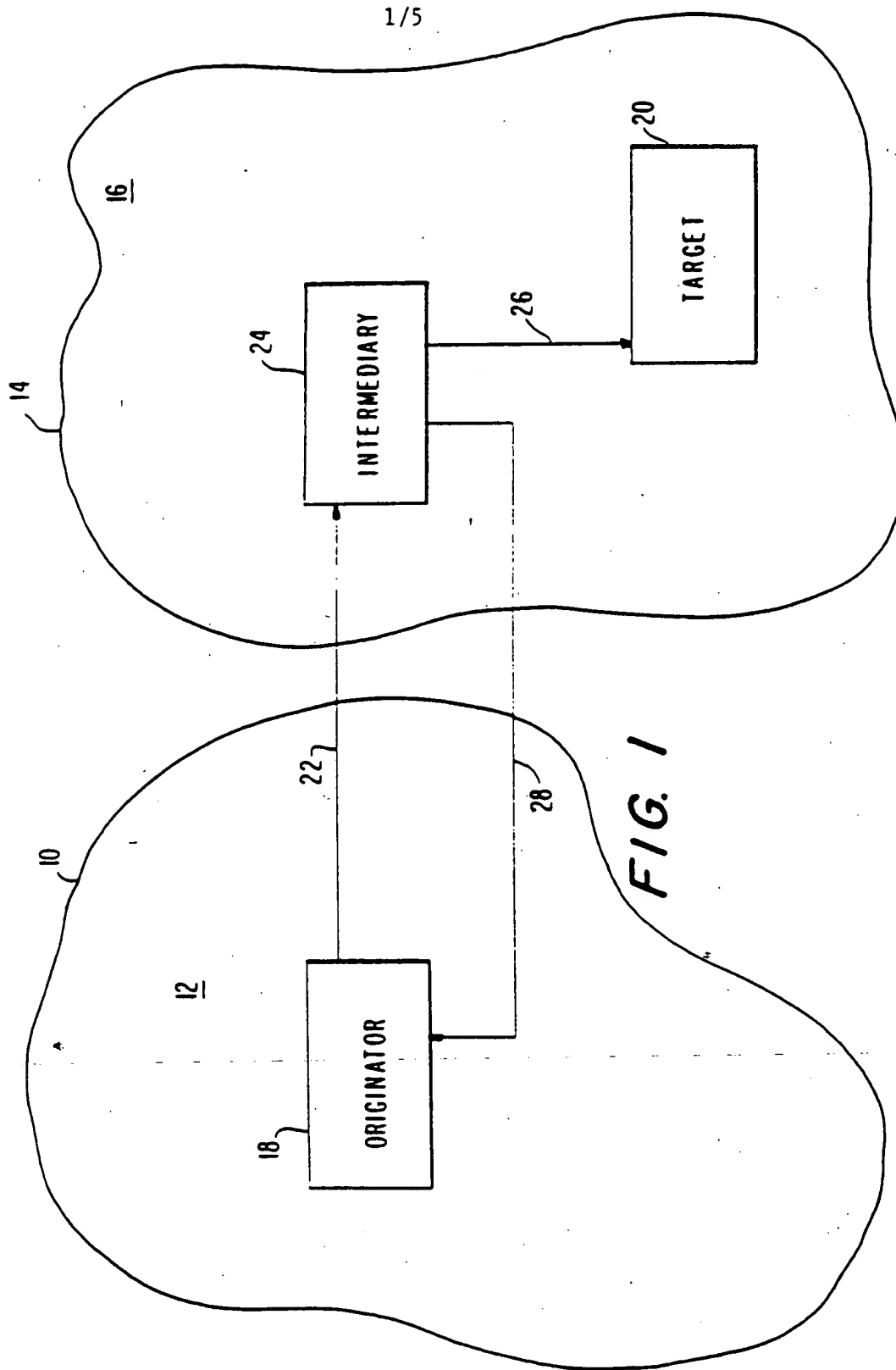


FIG. 1

2/5

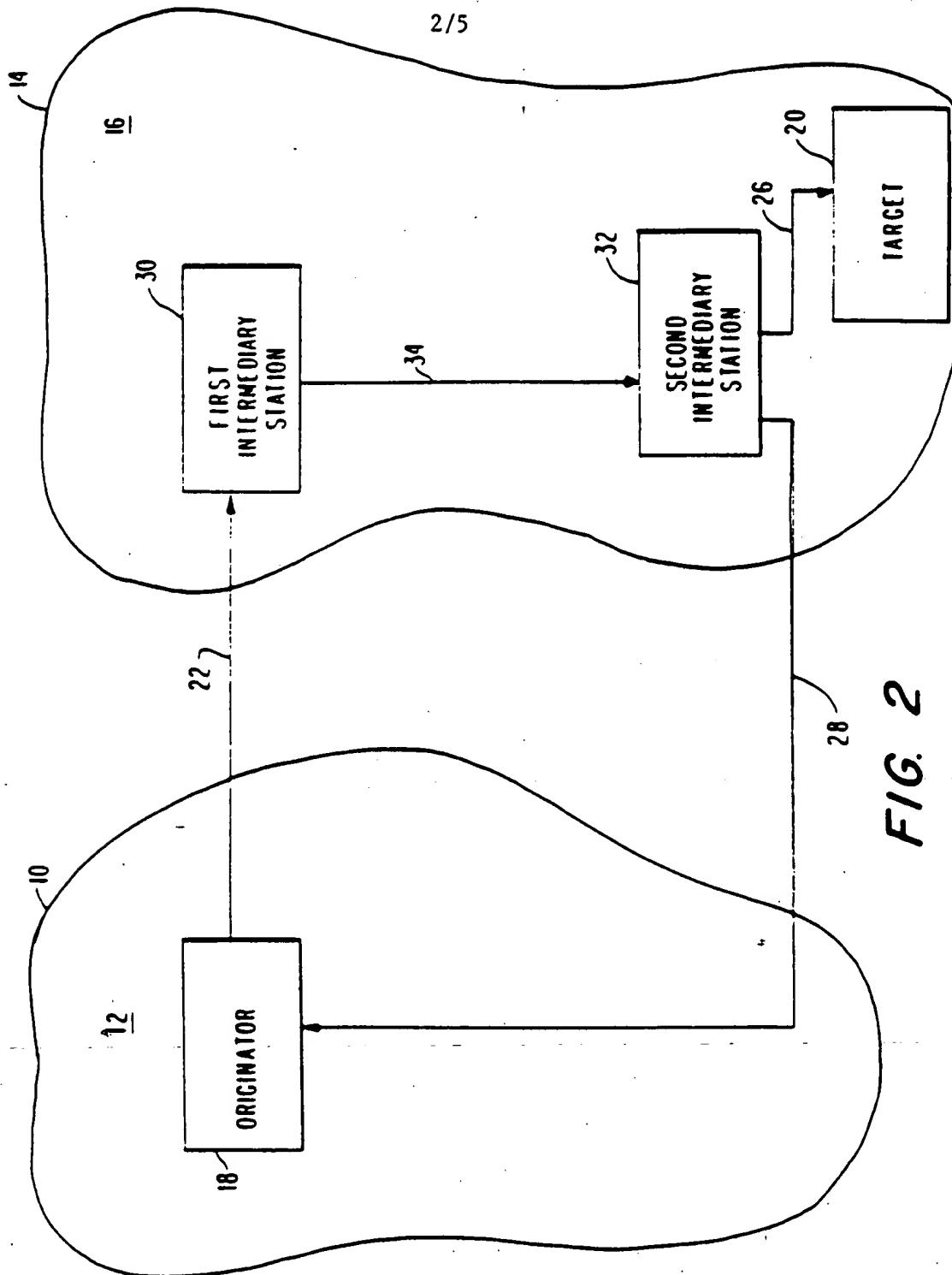


FIG. 2

3/5

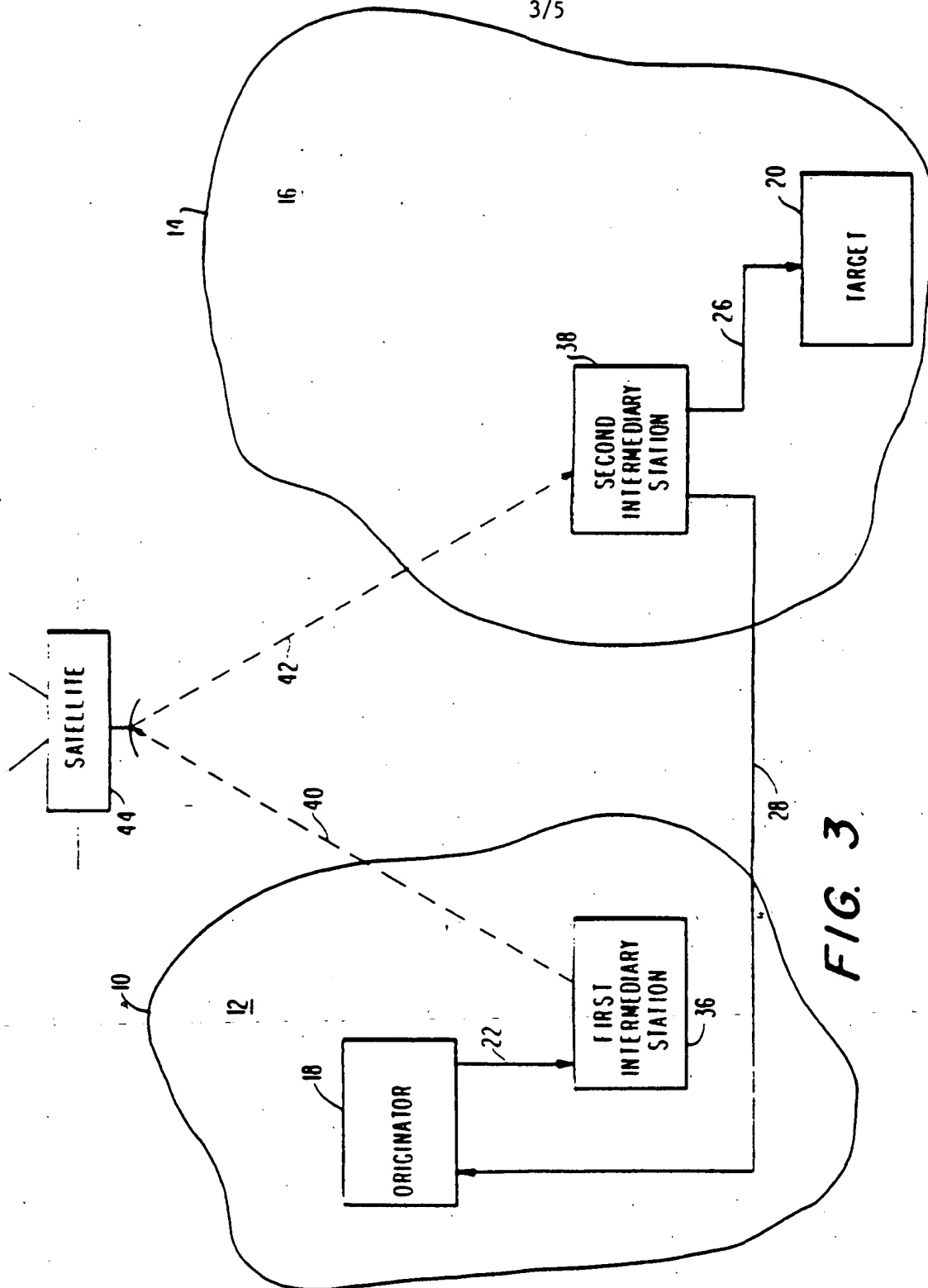


FIG. 3

SUBSTITUTE SHEET

5/5

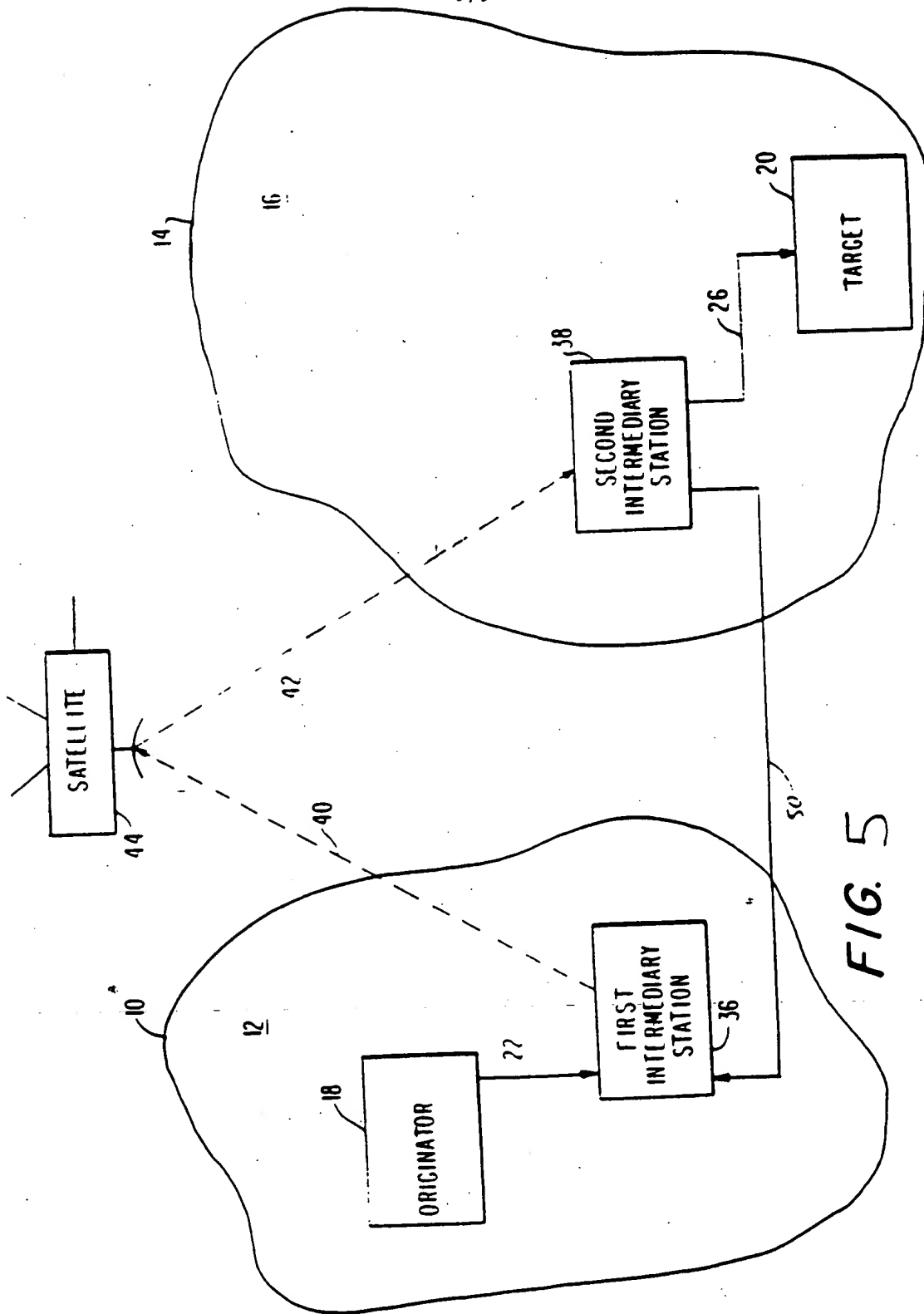


FIG. 5

INTERNATIONAL SEARCH REPORT

International Application No PCT/US91/04700

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶ According to International Patent Classification (IPC) or to both National Classification and IPC <div style="text-align: center; font-family: monospace;">IPC(5): H04M 3/42; U.S. CL.: 379/207.</div>														
II. FIELDS SEARCHED <div style="text-align: center; font-size: small;">Minimum Documentation Searched ⁷</div> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%; padding: 5px;">Classification System</td> <td style="padding: 5px;">Classification Symbols</td> </tr> <tr> <td style="padding: 5px;">U.S. CL.</td> <td style="padding: 5px;">379/207, 209, 218, 221, 223.</td> </tr> </table> <div style="text-align: center; font-size: x-small; margin-top: 5px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸</div>			Classification System	Classification Symbols	U.S. CL.	379/207, 209, 218, 221, 223.								
Classification System	Classification Symbols													
U.S. CL.	379/207, 209, 218, 221, 223.													
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹ <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 10%; padding: 5px;">Category ⁹</th> <th style="width: 70%; padding: 5px;">Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²</th> <th style="width: 20%; padding: 5px;">Relevant to Claim No. ¹³</th> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">X</td> <td style="padding: 5px;">US, A, 4,139,739 (von Meister et al) 13 February 1979, see abstract.</td> <td style="padding: 5px;">1-10, 12, 20, 32, 35, 36, 42</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;"></td> <td style="padding: 5px;">11, 13-19, 21 31, 33, 34, 37- 41, 43-61</td> </tr> <tr> <td style="text-align: center; vertical-align: top; padding: 5px;">Y</td> <td style="padding: 5px;">WO, A 89/06083 (Gordon et al) 29 JUNE 1989 see abstract.</td> <td style="padding: 5px;">11, 13-19, 21 31, 33, 34, 37- 41, 43-61</td> </tr> </table>			Category ⁹	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³	X	US, A, 4,139,739 (von Meister et al) 13 February 1979, see abstract.	1-10, 12, 20, 32, 35, 36, 42	Y		11, 13-19, 21 31, 33, 34, 37- 41, 43-61	Y	WO, A 89/06083 (Gordon et al) 29 JUNE 1989 see abstract.	11, 13-19, 21 31, 33, 34, 37- 41, 43-61
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Y		11, 13-19, 21 31, 33, 34, 37- 41, 43-61												
Y	WO, A 89/06083 (Gordon et al) 29 JUNE 1989 see abstract.	11, 13-19, 21 31, 33, 34, 37- 41, 43-61												
<div style="font-size: x-small;"> ¹⁰ Special categories of cited documents: <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <p>¹⁴ "A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>¹⁵ "E" earlier document but published on or after the international filing date</p> <p>¹⁶ "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>¹⁷ "O" document referring to an oral disclosure, use, exhibition or other means</p> <p>¹⁸ "P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 48%;"> <p>¹⁹ "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>²⁰ "X" document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>²¹ "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>²² "Z" document member of the same patent family</p> </div> </div> </div>														
IV. CERTIFICATION <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;"> Date of the Actual Completion of the International Search <div style="text-align: center; font-family: monospace; font-size: 1.2em;">20 August 1991</div> </td> <td style="width: 50%; padding: 5px;"> Date of Mailing of this International Search Report <div style="text-align: center; font-family: monospace; font-size: 1.2em;">18 SEP 1991</div> </td> </tr> <tr> <td style="width: 50%; padding: 5px;"> International Searching Authority <div style="text-align: center; font-family: monospace;">ISA/US</div> </td> <td style="width: 50%; padding: 5px;"> Signature of Authorized Officer <div style="text-align: center;">Wing Fu Chan </div> </td> </tr> </table>			Date of the Actual Completion of the International Search <div style="text-align: center; font-family: monospace; font-size: 1.2em;">20 August 1991</div>	Date of Mailing of this International Search Report <div style="text-align: center; font-family: monospace; font-size: 1.2em;">18 SEP 1991</div>	International Searching Authority <div style="text-align: center; font-family: monospace;">ISA/US</div>	Signature of Authorized Officer <div style="text-align: center;">Wing Fu Chan </div>								
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